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Future Internet and Future Network

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ABSTRACT

As we live in 21st century the major issue is growing of population and with that growing of population it leads to increase in consumption of resources hereby mainly referring to internet and network. The number of users linked to the Internet has increased exponentially and the current networking architecture is experiencing tremendous challenges with emerging needs for security, mobility, agility and commercial viability. The limit of the original Internet is continously becoming inadequate to handle large amount of traffic patterns delivered by new services such as mobile communications, server virtualization, cloud services, and big data. The paper provides a brief introduction to future Internet and future network research. Also this paper discusses those challenges to regulations related to communication networks and the Internet.

I. INTRODUCTION

As we discuss about internet and network in this paper, let us have a brief idea of them first. A network is a group of two or more devices that can communicate. It is a collection of computers, servers, mainframes, networking devices or other devices connected to one another to allow the sharing of data. It consists of multiple computer systems connected by physical and/or wireless networks. A perfect example of network is the Internet. The internet is a worldwide network- connected system that uses some protocols to send information through different media types. Internet has been one of most revolutionary technological advances of our times. Internet is forming an increasingly united system for processing, storing, accessing and distributing information and managing content. Present communication networks and also the Internet, face difficulties and requests from new communication trends efficiency. Therefore, in recent years, the future of networking has been a major concern subject. The main distinction between present and future is that present networks and the Internet are not made to describe all the technical and non-technical problems arising from the requirements of interaction and computing. Therefore on the other side, we tackle the difficulties of the current architecture such as mobility, heavy-traffic conditions, service quality and safety. On the other side, the demands and comprehension of today's applications, we are looking for ways to grow the Internet today.

II. CURRENT INTERNET

The Internet is a worldwide network comprising of a wide variety of computer networks. It is an informative data source and a significant way of communicating with the world today. These networks and computers are linked through communication lines and communicate through the use of a common language of transmission-the Transmission Control Protocol / Internet Protocol (TCP / IP). It offers, utilizes or makes high-level facilities based on communications and associated infrastructure available either openly or privately. The Internet today is not a easy structure. It comprises of multiple WAN's and LAN's linked by connecting devices and switching stations. Today many end users who are in need of Internet connection make use of the services of Internet service providers (ISPs). Private companies run the Internet today, not the government. In just a few centuries, the Internet has evolved tremendously. Factors affecting advancement include the following:

- New Protocols
- New Technology
- Increasing use of multimedia

A. Benefits to the users

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- High Speed

Information on the Internet is transmitted at high speed across the telecommunications network. Document pages that require minutes to be transferred by fax or days by post can be transferred in a few seconds.

- Low Cost

Most data and databases on the Internet are given free of charge. Users are only charged for the network connection. Furthermore, data transmission over the Internet is much cheaper opposed to frequent postal mail or fax machine transfer.

- Information Currency

Due to the time lag between the accessibility of data and publishing, the contents of many novels and journals lack currency. However, information is accessible to all customers in electronic type instantly after being updated.

- Comprehensive source of knowledge and entertainment

Internet databases cover almost every part of our lives. Some of the bigger databases provide law, government, medicine, computers, history, and education information. Others include hobbies, fashion, sailing, astronomy, food and beverage, durgs, religion news, etc. Discussion groups and teleconferencing allow Internet users to gather data and expertise from all areas specialists. Games, pictures and sounds also make the Internet an entertainment resource.

- Communication beyond boundaries

For those that communicate on the Internet, national boundaries are removed. One can communicate with anyone else on the other side of the world over the Internet.

B. Problems of current Internet

- The Internet has no main authority, despite the vast amount of networks engaged. Many of its instructions come from the Internet Society, which is created by a community of volunteers with technological concerns. There is no control over how the Internet is used by people or censorship of the data on the network.
- Since there is no censorship of data on the Internet, the network can find undesirable and harmful products. Hacking data, creating bombs, creating drugs, or committing suicide from the system can be obtained. There are also worries that individuals who use it to distribute rumours or incorrect data to warn the public.
- It is much easier to copy and reproduce online, on CD-ROM or in other electronic forms including the Internet than to copy from books. This produced copyright enforcement issues. The challenge is compounded on the Internet as it is a worldwide network that contains a large number of papers from numerous resources.
- Internet communication very often spreads over various countries. In such instances, information is transferred across lines of communication and routed from one network to another before reaching their destinations. It is therefore a matter of concern that personal or private business information transferred over the network are secure.

III. CURRENT NETWORKING MODEL

- The present of network architecture has been intended to provide fundamental host connectivity.Improvements to use packet switched routes in network protocols enhanced the effectiveness of the data route. All these improvements were restricted to provide increased accessibility and added operational complexity to mor and more protocols for distinct reasons.
- The present model of the network was intended to manage services such as email and web browser, where a host requests the service and the server offers the service to the client. As more and more complicated content services are being provided where a portable client application requires various servers to process, the constraints of this model appear.

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- The revenue model of the network service provider was to sell the user bandwidth from the previous circuit-switched model . Network esign was therefore focused on providers maximising the effectiveness of the network bandwidth. Network service provider in this model should manage the complexity of specific configurations for network vendors. The want for end to end user experience is placing pressure on the model.
- Security was added as additional overlay in the network architecture with authentication, encryption and authorization. It was not scheduled at first. Scalability of these safety designs became a bottleneck with the emergence of big amount of mobile devices entering or exiting the network service. Authentication and filter updates are performed at device level and they need to be applied more quickly depending on network configuration modifications.
- Much work went into efficient use of the data plane with the advent of IP network protocol. The current network architecture control and management plane is still specific to equipment. This adds complexity and operating costs to networks of large scale.

IV. NEED FOR CURRENT NETWORK EVOLUTION

- COMPUTING EVOLUTION

Computing saw the recent server virtualization and cloud computing technologies. Instead of keeping local information and computing devices, users began using these distant services from mobile devices. This generates a powerful incentive to provide flexible access to these servers for the network architecture. The opportunities for evolution in networking were also given by virtualization in the computer processor and input output devices.

- TRAFFIC PATTERN

The network traffic pattern is moving slowly away from the fundamental model of the client server. One application currently communicates with various servers and databases on a mobile device. Before reacting to the customer, service provider may perform parallel processing on various servers. Private cloud, government cloud communication triggers extra machine for network-wide machine communication.

- Data Protection

These days, corporate data can be accessed from any device with comparable compliance. With the fresh authentication and permission requirements, this contributes to important safety requirements. Data security is an significant element of networking future with content services and cloud builders. More and more economic transactions need network operations that are more safe than ever.

- Service Agility

Web2.0 service suppliers need the agility with minimum latency to access any service infrastructure via the network. In addition, the demands for bandwidth are no longer fixed. Due to an event that may not be the case at any other moment, there may be important traffic on a specific website on a specific day. The web service provider should provide agility to demands for elastic scaling.

- Granular Network Control

Context-conscious networking demands seek major developments in the capacity to reprogram networks with granular network control. This generates the need for command not only at the level of the machine but also at the stage of customer, session, device and implementation.

V. FUTURE INTERNET

How fast is the Internet in future?

10 G is the future broadband technology platform that will deliver 10 gigabits per second of residential web speeds – 10 times quicker than the networks of today.

More than 50 billion Internet-connected devices with strong sensing and computing capacities are anticipated to be attached by 2020. This will allow visions of the Internet of Things (IoT) and intelligent environments where individuals, things, devices and actuators communicate with each other continually, blurring the

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divisions between the cyber and the physical world. How much our technology has changed is difficult to realize. It doesn't happen suddenly, the way we elect a new president or open a restaurant. It occurs gradually, sometimes in fits and spurts, but generally under our notice they exist in changes or adaptations so minor. Connection speeds are increasing gradually, Wi-Fi accessibility is ratcheting up, new devices are influencing designs, and consumer trends are shaping features, so we've gone from a slow, dial-up, boxy Internet version to one that can be accessed at incredible speeds from fairly much anywhere in the last 15 years. The marketing sector (among others) is totally revolutionized, implementing approaches that never existed before and obsolete a number of older ones.

A. So what's going to change in another 15 years?

How the Internet will Evolve ?

There are many published articles, characteristics, and works trying to predict how the Internet and the technology world will evolve. Predictions range widely, as you may think, but in most of the sources and projections, there are a few ideas that stand out:

- Internet connection will be permanent and automatic. We have been "connecting" to the Internet in various ways, from the dialing process to the process of entering once for a given location a Wi-Fi password. Connectivity will gradually be continuous and can be made easy to the point where there is actually no need for individual "connection." Universal Internet is increasingly becoming a reality, and overlapping between devices can create a repeatation layer that avoids concerns about service outages or weak connections.

- Bigger role would be played by Augmented and virtual reality

Mobile devices let us in the actual world access to the Internet, but next-generation devices will either project or embed the Internet into the real world via a form of augmented reality. While Augmented Reality has had some unsuccessful fits and begins, its close cousin, virtual reality, is beginning to see major growth in the midst of the launch. A few years back, the world wasn't ready for AR, but it'll be a few years from now.

- Machines might take over jobs.

Machines are already capable of many manual duties and begin to master high-level and intellectual duties. These applications will, in combination with the ubiquitousness of the Internet, create it so that less work and more resources are accessible immediately. The need for individuals to work will reduce together with job accessibility, leading in a more or less balanced scheme. We will surely face difficulties of unemployment and unbalanced resource distribution as we struggle to discover this balance— but these are short-term disadvantages of a more linked, richer globe.

- Privacy would become commoditized.

With a steady (and potentially unseverable) Internet connection and more life-long applications, privacy will become an even greater problem. Even to the point in which only the rich could afford to go off the grid, it could be commoditized. As a consequence, I expect we will see a number of autonomous organisations and businesses struggling to keep a certain level of security for customers; another tale is whether or not they will succeed.

- The 'Internet of Things' will completely mature.

The "Internet of Things" already connects refrigerators, alarm clocks and numerous other equipment in the household. That link will extend in another 15 years to vehicles, bank accounts, health controls, and perhaps even our paper currency. The more data continues to flow, the greater power and liberty that we have; this reality will drive our desire to link all we can to the Internet.

- Firms and individuals will face difficulty to adapt to the increasing rate of change.

As quickly as we're used to creating technology, and as incredible as some of these advances seem, the speed of future growth will be even more incredible. The growth of Internet-based systems will increase to the

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point that it feels out of control for many , thanks to machine learning and enhanced computing power. Businesses and people may find it difficult to adapt.

- Earth will not be the only planet which will have access to the Internet.

Currently the Earth is the only planet with access to the Internet. Mars will also have access to the Internet by 2030. The first colonists in Mars will need to be able to converse with family and friends back home and then use the internet to do so. Orbiting satellites around Mars will transfer Internet information back and forth, although information transmission back to Earth will require up to 24 minutes.

B. Challenges to future internet.

- Sustainable and fair infrastructure.

A main task for the internet to move forward is to ensure that the hardware and infrastructure underpinning it is viable and can contribute significantly to creating a more circular and honest economy. The difficulties surrounding the environmental footprint of the internet are numerous: from the exceptional quantity of energy that information centers and emerging technologies such as blockchain use to the expensive mining procedures behind the components that make our tech systems work. It is estimated that the worldwide amount of linked' stuff' will reach 21 billion by 2020–generally difficult to recycle and intentionally intended not to last long . Can the planet sustain such massive growth in connectivity? Our want for internet-based devices not only harms the planet, but also supports exploitative and hazardous manufacturing procedures throughout the supply chain, from resource mining that often depends on child labour, to hazardous labour practices in factories that actually create our hardware.

- Cyber security and resilence.

A main element of constructing a more democratic and vibrant Next Generation Internet is to ensure secure, safe and robust Internet infrastructures underpinning the Internet itself. We are living in a moment of increasing cyber threats that we are unprepared for: from increasing cyber crime to increasingly advanced cyber warfare skills, driven by new technologies such as independent guns and quantum computing. There are weaknesses and faults in the basic infrastructure and protocols of the internet that also require urgent repairing. Governments, the private industry and people need access to the appropriate tools and data to assist them avoid such threats and In order to ensure that our infrastructure is robust in the face of future difficulties, major system modifications are required.

- Trustworthy online information.

Probably one of the largest scalps of the Internet's unrestrained development is the health of our media ecosystems: earnings for good journalism have cratered, and the ad-driven business practices that support online data supply have empowered the sensational over nuance, clicks over reality. The proliferation of "fake news" and data armament is a main challenge for the web today, threatening our democracies and societies ' very construction blocks. Confirmed access to trusted data and conserving intentional manipulation of data flows without censorship and impairing liberty of expression continues an unresolved task. Not only do we need to ponder more about particular, especially media-friendly subjects such as unreal news, big-fakes, filter bubbles, and Twitter bots, but we need to take a broader perspective of how we can build good (social) media ecosystems and generate feasible optional business models for better news as well as sharing data.

- Online identities and trust.

We are presently witnessing a great increase in interest in online identity technologies, driven both by private sector initiatives and public initiatives. Creating a trusted and safe online identity management scheme would be extremely important: it could assist refugees, often left stateless and facilitate their access to support systems, help create online transactions to be safer and enhance the effectiveness of our communications with public services. Impactful identity management would not only boost confidence on the internet and thus support the digital economy, but would also assist us to create more private online relationships. The presently dominant rate-and-review scheme places a lot of authority in the reviewer's hands (the capacity of a driver to attract fresh clients can be severely damaged by only one low score on ride sharing app), other e-identity and reputation management technologies could create these interactions more good and equal.

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Discussions on online identity management schemes are just one component in a wider debate is of how we can switch to an internet based on trust principles .

- Decentralising Power.

Most of the problems facing the internet today are a direct result of increasing internet power monopolization and business models that support this dynamic. Even problems that are only apparently linked to the disproportionate control of Big Tech and certain governments become more difficult to tackle, as the tiny amount of actors who have the authority to create a change are often reluctant to do so. We quickly need fresh business models that could provide an option to the existing capitalist monitoring model and support a more healthier digital economy. Other models, such as cooperative platforms or common-based methods, can assist licensed smaller projects and provide better protection for customers and digital employees. We need to assist projects and small and medium-sized enterprises operating under these still less sustainable models through policies, financing and procurement, and encouraging government implementation.

- The right to opt out and self govern.

With the Internet being increasingly widespread in our lives and societies, creating our employment, our towns, interaction with the government and many more. It has become tougher for people to form their terms with, or totally opt out of, "the Internet". With the increase of the smart city and the millions of linked IoT devices that will carry it, tracking our every step, how can we guarantee that people accord to what happens with the information they produce and maintain their privacy? With everything from our intelligent vacuums to loan card firms collecting and selling our information to the largest bidder , we need fresh alternatives that assist people to give informed approval, as well as the capacity to fully opt out of being part of, for instance, information sharing schemes while still being able to use important facilities. The design of new devices tend to limit our capability to "tinker" with them (it is tougher to build smartphones than it used to be to build computers), and the increasing popularity subscription services like Netflix and Amazon Prime have turned us into content renters rather than owners.

- Data sovereignty.

One of the greatest issues faced by the Internet today, and the primary cause of the unequal power distribution in the digital economy, is the attentiveness of information in the hands of only a few players. As the use of data- driven alternatives is beginning to impregnate more and more elements of our societies, this rat race to gain access to our private data is no longer just a danger to our privacy, but to our individual sovereignty. We need to test and create new designs such as personal data stores and popular information models, and also consider how regulation can be used effectively to help democratize information ownership. Whatever sets of measures we eventually pursue, restoring data sovereignty will also require technological sovereignty to be reclaimed. Today, Europe is designing less of the technologies and apps on which we depend.

- Ethical AI and Machine Learning.

As debates over the probably transforming effect of Artificial Intelligence and Machine learning have came to dominate public discussion in latest years, there are worries about the possible adverse side effects of enabling these types of techniques to play and ever greater part in our societies decision taking and governance. We will have to embed ethics all around the value chain of the system: only responsible sources and managed information and algorithms should be used to develop ethical AI and ML instruments that do not continue current societal biases and are responsible. In addition, the instruments themselves should be used only for reasons that we believe ethically, or at least not harmful. The only way to create truly accountable AI is to ensure that we have alternatives that are honest and inclusive across the value chain.

- A distinct and secure internet.

The next billion Internet consumers moving online are going to look very distinct from the very first billion Internet users. In designing technological alternatives and applications, however it is still most often the needs of the latter group that are taken into consideration. Increasing variety in who can construct and use the Internet is essential if we are to guarantee that we do not perpetuate current inequalities in the digital economy as well, but also help most innovation as various teams tend to become more creative. Addressing

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the present absence of technology sector diversity will involve a mixture of ambitious educational initiatives to assist in training. It not only creates possibilities for those who are usually marginalized in the online discourse, but also ensures that the internet offers room for everyone. The increase of twitter mobs and troll armies has led many people to share distinct views or from distinct internet communities. We also need to guarantee that it is secure and free from offensive behaviour in order to really promote a varied internet.

- An accessible and open internet.

Before we can start talking about constructing a Next Generation Internet, we need to make sure that everyone can start with accessing the internet. This implies tackling structural obstacles to access, such as investing in infrastructure and broadband access, and encouraging multilingualism and accessibility, which implies that many websites are still too difficult to use for users online, but also consider the more social obstacles that are preventing individuals from going online. Think about enhancing digital abilities and ensuring that the Internet offers a secure atmosphere for everyone.

VI. FUTURE NETWORK

The future of networking is an interdisciplinary study subject that involves technical and non-technical views on electronic communications and multiple ICT applications.

At this period of time, two main methods are considered:-

Information Centric Networking (ICN) is a promising idea for the Future Internet based on naming content rather than naming hosts as in TCP / IP. Naming content allows effective content distribution to be cached in the network and simplifies multihoming . Our present research focuses on assistance for mobility and transfer as well as fresh ICN architecture routing systems like Content Centric Networking (CCN).

Network virtualization, isolating distinct networks from each other, provides a chance to move from current IPv4-based networks to fresh technology and methods such as ICN-based architecture. As it reserves funds for flows, software defined networking (SDN) with open flow can be viewed as a first move in that direction. Network virtualization will go further and reserve physical resources for networks, including computing and caching resources.

A. NETWORKING OBJECTIVES

Future telecommunications networks are a structure established by the International Telecommunications Union (ITU). ITU has set four Future Networking objectives:-

- Service awareness.
- Data awareness.
- Environmental awareness.
- Social and economic awareness.

B. Goals of future networking architechture

- Abstractions

Software and device infrastructure should be derived so that the underlying hardware should not be concerned with ordinary network tasks. Regardless of where it is situated, the network resource should be usable. It should provide flexibility and vendor neutrality.

- Openness and Programmability

Demand-based services can be introduced at network level by incorporating the network programming software application. Easily adding software and services and distributing and noticeable network status. Network programming at the point of network conduct and not at the level of network machinery.

- Efficiency

The network resources should be used effectively with improved traffic engineering, capacity optimisation and quick management of faults.

- Reliability and Consistency

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Focusing on continuous user experience regardless of the device and place it utilizes gives the network's reliability and consistency requirement. The key is also to minimize downtime.

- Responsiveness

It should be simple to monitor the network and users should be able to obtain the services within reasonable reaction times. The service recovery should be quick enough in the event of faults.

- Automation

With various systems, the operator should be able to configure the network together. Automation should be simple to supply without taking into consideration the type and place of the device.

- Inter-operability

Existing networking equipment should be able to use the latest network architecture. The architectures should be sufficiently flexible to interact with current systems.

- Scaling

With the addition of fresh network components or services, the network architecture should be prepared to scale up.

- Service Chaining

The network function should be abstracted so that services can be chained to provide users with the full experience at different network nodes.

C. Challenges for future network prediction :-

For three reasons, the future of computer networking was particularly hard to predict:

- Technically complicated computer networking makes it difficult for observers to comprehend difficulties and see trends.
- Computer networks and the Internet are well-marketed, subjecting them to the impacts of the economic sector and big business.
- Networks operate on a global scale, which means disruptive influences can come from nearly anywhere.

Due to the development of network technology over several centuries, it would be logical to believe that these systems will also continue to develop gradually over the coming centuries. History, on the other side, indicates that some revolutionary technical breakthrough might one day make computer networking obsolete, just as telegraph and analog telephone networks were replaced.

D. The Future of Networking – an Evolutionary View If network technology continues to evolve as fast as it has over the previous twenty years, we should also expect many changes in the coming decades. Here are some instances :-

- IPv6 will takes over.

Experts have long anticipated the demise of IPv4 since the Internet was literally supposed to run out of address space. That never occurred entirely, but IPv6 now seems ready to lastly displace IPv4 on networks all over the globe.

- Domain names become obsolete.

Wait for the cost of dot-com applications to collapse and for domains, plus the Domain Name System (DNS), to eventually vanish as web browsers are able to navigate to websites through voice recognition, eye motions and/or touch buttons.

- Broadband routers and other home gateways become obsolete.

As individuals end up owning hundreds of portable and mobile devices that need to interact both inside and outside the home, it will no longer make sense to install fixed routers inside a home to handle traffic . Devices will all interact directly with one another and the Internet.

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VII. CONCLUSION

With growing expectations, growing needs, growing customers and new technologies, the current internet and current network should and will develop entirely over time. This paper lets you know the tremendous changes coming in current internet and current network. Also in this paper the authors have discussed about the current internet and current network and its need for evolution followed by future internet and future network and the challenges for future internet and future network. This paper is quite helpful for basic knowledge of internet and network now and in future.

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